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## SYNOPSIS AND DESCRIPTIONS OF EXOTIC NEUROPTERA.

BY NATHAN BANKS.

Included below, with the descriptions of various new genera and species, are synopses of the genera of Panospidae, Osmylinae, Hemerobiinae, Mantispidae, South American Myrmeleonidae and a new classification of the Perlidae; most of the synoptic work is a result of a study of several European collections.

The types of all the new species described in this paper are in the author's collection.

### PERLIDAE.

Twice I have published classifications of the American Perlidae. After seeing several genera (hitherto unknown to me) in European museums I have prepared a new arrangement, which, however, differs little from the others as far as American species are concerned, but places in the same scheme the various exotic genera.

For the principal character I would use the shape of the anterior part of the head.

1. Clypeus practically invisible, or only projecting from beneath the raised margin of the front of the head; tarsi with the last joint very much longer than the first and second together, the first joint barely, if any longer, than the width of the tibia at tip; coxae I widely separate; setae present; no series of cross-veins in the cubito-anal space.....PERLINAE.  
Clypeus visible in continuation of the general surface of the head, and separated by a suture from the head; tarsi with the last joint but little or not longer than the first and second together, the first joint longer than the width of the tibiae at tip, last joint of palpi as large as others.....2.
2. Many cross-veins in the apical part of fore wings; median vein not united to the radius near base; setae well developed; second tarsal joint much shorter than others...PTERONARCINAE.  
Few cross-veins in the apical part of the fore-wings; median vein united to the radius toward base; first and second tarsal joints together longer than the third .....NEMOURINAE.

Subfamily Perlinae may be divided into two tribes as follows :

- Median vein united to radius near base ; anal cell with one branched vein.....CHLOROPERLINI.  
 Median vein not united to radius near base, but running closely parallel thereto ; anal cell with two veins.....PERLINI.

The Chloroperlini include three genera, *Chloroperla* and *Alloperla* in which the last joint of the maxillary palpus is very minute, and *Paraperla* in which this joint is well developed. *Paraperla* also has a series of cubital cross-veins in the hind wings. In venation this tribe is remarkably similar to the Nemourini, but differ by well developed setae and the retracted clypeus.

The Perlini includes many genera, most of which I have tabulated in my tables of American Perlidae or are given by Enderlein (Zool. Anzeiger, xxxiv, p. 388, 1909). I cannot consider the number of ocelli as of importance in grouping genera, since one of the two ocelli genera—*Hemacroneuria*, is evidently more related to *Acroneuria* than to *Neoperla*. The genus *Ochthopetina* made for Old World Neoperlas is very doubtfully distinct from *Neoperla*. *Macrogynoplax* differs from *Neoperla* only in the female genitalia. *Cryptoperla* differs from *Neoperla* in the hairy eyes and frontal ridge of head. *Niponiella* I would consider as *Acroneuria*, *Dictyogenus* as *Isogenus*, and *Dictyopterygella* as a *Perlodes*. The several divisions of *Perlodes* and *Isogenus* made by Klapalek are hardly more than subgenera, and mostly based on genital characters. *Tropidogonoplax* is about the same as *Ochthopetina* and *Tavanita* a synonym of *Ochthopetina*.

Subfamily Pteronarcinae may be divided into three tribes as follows :

- Anterior coxae more approximate than the others ; many costal cross-veins ; no cross-veins in the cubito-anal space of the fore-wings .....PTERONARCINI.  
 Anterior coxae widely separated ; no series of cross-veins in cubito-anal space ; few costal cross-veins.....LEPTOPERLINI.  
 Anterior coxae widely separated ; a series of cross-veins in the cubito-anal space of fore-wings .....EUSTHENINI.

The Eusthenini includes three genera ; *Stenoperla*, green

in color, and with very few costal cross-veins, *Diamphipnoa*, which has many costal cross-veins, and *Eusthenia* with partly red or violaceous wings, *Diamphipnoa* has lichen-green wings, and the median series of cross-veins in fore wings is crossed.

*Diamphipnoa lichenalis* Gerst. has the anterior coxae widely separated; last joint of tarsi longer than the two others together; ocellar triangle longer than broad behind; the subcosta runs into the radius at tip; many of the median cross-veins crossed; a series of cross-veins in the cubito-anal region (not in *Pteronarcys*).

*Eusthenia thalia* and *E. diversipes* belong to *Austroperla*. There are no series of cross-veins in the cubito-anal space, and the costal area has cross-veins all along; the anal cell has two branches, setae very short. The two species are very similar. The genus *Heteroperla* Hare is a synonym of *Austroperla*.

The Leptoperlini is the group of *Antarctoperla* of Enderlein; small, slender, dark species, looking much like Némourini but with many cross-veins, sometimes only indicated, in the apical part of wing. The type of *Leptoperla*, *L. beroe* Newm. has slender legs, long antennae, and long setae, the last joint of tarsus not equal to the basal two; the radial sector soon forks as seen in figure 29. In *L. opposita* the setae are shorter, the tarsi have last joint longer, and radial sector is simple, while the cubitus is forked as in figure 30. The genus *Parantoperla* is very close to *L. opposita*. *Aucklandobius* is hardly distinct from *Notoperla*.

The genera of this section may be tabulated as follows:

1. Many costal cross-veins; setae very short.... **Austroperla**.  
Only one or two costal cross-veins.....2.
2. Radial sector of fore-wings forked.....3.  
Radial sector of fore-wings not forked.....4.
3. Radial sector forked toward tip; cubitus forked at the basal cross-vein.....**Gripopteryx**.  
Radial sector forked near base; cubitus forked long before the basal cross-vein.....**Leptoperla**.
4. Hind-wings with cubital cross-veins...**Notoperla** (*Aucklandobius*).  
Hind-wings without cubital cross-veins.

**Antarctoperla** (*Parantoperla*).

Pictet's type of *Gripopteryx cancellata* has the vein from anal cell forked, two costal cross-veins, one near base, and one at tip; hind wings with three cubital cross-veins near tip; radial sector of fore wings with one branch, the median vein before the large basal cross-vein is rather weak but distinct, in both wings the cubitus forks at this cross-vein; last joint of tarsi plainly longer than basal two together; the setae with many very short joints.

*Paragripopteryx* differs only in having a cross-vein beyond end of the subcosta.

The Pteronarcini includes only the two northern genera, *Pteronarcys* and *Pteronarcella* occurring in northern North America and Siberia.

The subfamily Nemourinae can be divided into two tribes as follows:

Anal cell with one simple vein; setae usually distinct.....CAPNINI.

Including *Capnia*, *Capnura*, *Capnopsis*, *Arsapnia* and *Capioneura*.

Anal cell with a forked vein; setae rudimentary.....NEMOURINI.

Including *Nemoura*, *Perlomyia*, *Udamoceria*, *Leuctra*, *Taeniopteryx* (with three subgenera) and *Taenionema*.

**Ochthopetina clarissa** n. sp.—Almost wholly clear pale yellow; tips of palpal joints dark; antennae beyond base brownish; ocelli and eyes black; tarsi rather dark; last five joints of anal setae dark; venation wholly pale yellowish, probably greenish when alive. Ocelli nearly contiguous; lateral bosses smaller than ocelli, nearly round, and hardly more than their diameter from the lower inner edge of eyes. Pronotum broader in front than behind, slightly convex on front margin, sides with several prominent rugae; wings rather long, about ten costal cross-veins, several beyond end of the subcosta; radial sector forked about the width of a cell beyond the anastomosis, four median cross-veins, four cubital cross-veins, and four branches of cubitus beyond. Female ventral plate evenly convex at tip. Length 12 mm.

*Type*.—♀. From Los Banos, Philippines (Baker).

**Eusthenia costalis** n. sp.—Black; a yellowish white fringe on base of clypeus and labrum; setae with yellowish hair. Wings beautifully violaceous, only indistinctly marked with pale around veins; a pale band beyond middle, the costal area reddish-yellow, but not as in *E. spectabilis*. The venation is as in *E. spectabilis*, but the wings are rather shorter than in that species; the recurved superior append-

ages of the male are slender and not widened at tip (in *E. spectabilis* they are widened at tip and acute on inner side). Expanse 43 mm.

*Type*.—♂. From Magnet, Tasmania (Lea).

Easily distinguished from *E. spectabilis* by the violaceous wings as well as by the male genitalia.

### PSOCIDAE.

**Myopsocus enderleini** n. sp.—Related to *M. muscosus* Ender. from Japan. The markings of the wings are very similar, the dark spot on the union of the cubitus and the median is here larger and darker colored, the stigma is pale, with a few faint dark dots near the costa, and there are more pale spaces along the veins in the apical part of the wing. The antennae and legs are pale grayish; head brownish-yellow, unmarked. The venation is similar to *M. muscosus*, except that the stigma is a little more swollen at tip, and the outer side a little more oblique; the median cell is rather broader and the cross-vein from it to the hind margin shorter than in *M. muscosus*; the forking of the radial sector is also rather farther out than in that species. Length 5 mm.

*Type*.—♂. From Los Banos, Philippines (Baker).

### MANTISPIDAE.

In 1910 Dr. Enderlein published an excellent classification of the Mantispidae, but in several points it can be improved. The length of the radial cells is of such a comparative character and so gradual in the variation from one species to another that it can hardly be used as a generic character; the number of branches of the radial cells varies in some species. *M. indica* is given by Enderlein as type of *Mantisquilla* with but one branch from the first radial cell, and so figured by Westwood, yet in one specimen of the type series (in British Museum) the first radial (as others) has two branches. However I think that *Mantispa* may be divided according to whether the pronotum is hairy or not, and by this *Mantispa* and *Mantisquilla* remain, but most of the species are transposed from one genus to the other. *Entanoneura* falls as a synonym of *Mantisquilla*.

Dr. Enderlein separates *Anisoptera* and *Trichoscelia* also according to the number of branches to the first radial cell, *Trichoscella* having but two; yet in the type specimen of the genotype (*T. fenella*) there are two and a half, that is the

third is interstitial with end of the cell; and in other species this character is still more variable. Therefore the two genera should be united, and the *Anchieta* of Navas is also a synonym as Enderlein has already put it.

*Ditaxis* and *Drepanicus* are very close together, and perhaps identical; *Molinella* of Navas is the same as *Drepanicus*.

1. Front tarsi with one claw; front coxae divided more or less plainly into two parts.....MANTISPINAE-2.

Front tarsi with two claws: front coxae entire.

ANISOPTERINAE-5.

2. Second anal vein of fore-wings forked; cubitus in hind-wing not bent toward anal; radial cells long; pronotum short.

**Euclimacia.**

Second anal not forked ..... 3.

3. In hind-wings the cubitus bends down towards the anal, touching the anal or connected to it by a very short cross-vein..... 4.

In hind-wing the cubitus does not perceptibly bend down toward the anal; radial cells long and with several branches to each.

**Climaciella.**

4. Pronotum with hairs, not or barely wrinkled; antennae more than twice the diameter of the basal joint apart at base; pronotum very slender .....Mantispa.

Pronotum without hairs, but very plainly transversely wrinkled; antennae not twice the diameter of basal joint apart.

**Mantispa.**

5. Prothorax closed beneath; three closed radial cells; front tarsus without spine near end ..... 6.

Prothorax open beneath; two closed radial cells; front tarsus with spine above near end .....10.

6. Median vein of fore-wings united for a short distance with the radial sector; stigma barely longer than broad.

**Calomantispa.**

Median vein not united to the radial sector; stigma longer..... 7.

7. One series of gradate veins..... 8.

Two series of gradate veins; many costal cross-veins..... 9.

8. The median vein of fore-wing appears forked, a long cross-vein from the fork to the cubitus; costal area narrow.

**Theristria.**

The cubitus of fore-wing appears forked, or rather a short cross-vein from fork to the cubitus; costal area normal.

**Gerstaeckerella.**

9. Chilian species, green in color.....Drepanicus.

Australian species, not green.....Ditaxis.

10. Prosternum distinct ; hind tibia more or less thickened.

**Anisoptera.**

Prosternum not distinct ; hind tibia not thickened.

**Symphrosis.**

In the type of *Drepanicus* (*D. gayi* Blanch.) the antennae are wide apart at base ; the pronotum very short ; costal area reaches to the stigma, and has twenty-five cross-veins, some of them forked ; the radial cells long, the first with five branches, the second with two, and the third with five ; the subcosta does not run into the radius at stigma but connected thereto by a short cross-vein ; the costals beyond stigma are forked.

*Mantispa chilensis* Hag. is a *Gerstaeckerella*. The front femora are not much more swollen than in *Theristria* ; the vertex is tumid ; no branch from first radial cell, two from the second, three from the third.

*Mantispa delicatula* Westw. is a *Theristria*, the antennae are wide apart at base ; the long spine on femora I is longer than the width of the joint ; first radial cell with one branch, second with three branches ; in the hind-wing cubitus not bent toward anal.

*Ditaxis biseriata* Westw. In hind-wings the cubitus is not bent toward anal ; the antennae small and wide apart ; vertex strongly tumid ; hind tibiae long and slender ; the pronotum coarsely wrinkled.

The species of *Anisoptera* in the Oxford Museum (Westwood's types) may be tabulated as follows :

- |   |                     |
|---|---------------------|
| 1. Stigma of fore-wing about four times as long as broad ; front legs all pale.....               | 2.                  |
| Stigma not more than three times as long as broad ; front legs marked or dark .....               | 5,                  |
| 2. Fore-wings with dark marks.....  | 3.                  |
| Fore-wings not with dark marks.....   | 4.                  |
| 3. A band before middle of the wing, and the tip dark ; stigma yellow (fig. 41).....              | <b>fasciatella.</b> |
| Two dark spots behind stigma ; stigma also dark .....   | <b>fenella.</b>     |
| 4. Veins black ; stigma dark ; smaller ; first radial cell with two branches .....                | <b>sequella.</b>    |
| Veins marked with yellow ; stigma yellowish ; larger ; first radial cell with three branches..... | <b>iridella.</b>    |



5. Wings with dark spots; femora and tibia of front legs mostly black ..... 6.  
 Wings without dark spots; femora and tibia mostly pale; stigma dark on base, pale beyond ..... 7.
6. Fore-wing with basal spot, band, and stigmal spot; hind-wings with basal band (fig. 23) ..... **notha**.  
 Fore-wing with long subcostal streak; hind-wings unmarked.  
**fumella**.
7. First radial cell with four branches; hind tibia with black spot above .. ..... **partheniella**.  
 First radial cell with but two or three branches..... 8.
8. Hind tibia with apical two-thirds black; larger species.  
**eurydella**.  
 Hind tibia with faint dark cloud: smaller species..... **bella**.

**Mantispa moluccensis** n. sp.—Similar to *N. amabilis* Gerst. Yellowish, a dark mark on labrum, and a transverse mark on clypeus, a vertical mark between the antennae, and a dark cloud above antennae; antennae, except pale basal joints, black, no annulus; femur I brown in middle and at apex on both sides; prothorax brownish, with pale line through the middle; thorax mostly dark, scutelli yellow; abdomen brown, some of the segments narrowly pale above at base; middle and hind legs pale yellow, tips of their tarsi brown. Wings hyaline; venation black; stigma reddish, nearly as long as width of wing, not enlarged; first radial cell with one branch, second and third with one or two, six costals. Wings long and slender, cell beyond stigma much longer on costa than behind, next cell longer behind. Expanse 20 mm.

*Type*.—♂. From Amboina, Moluccas (Muir).

**Mantispa alicante** n. sp.—Yellowish; a rather broad vertical stripe on the face, and a transverse mark on the clypeus brown; vertex with median black mark, and faint dark marks each side; antennae pale, about three joints beyond middle black, then three joints yellowish, and the rest (about four joints) black; pronotum long, at the beginning of the narrow part is a faint swelling, but no tubercle, the anterior part is nearly smooth, but the long posterior part is covered with many minute, scabrous black points; this long part at about one-fourth before the end is wider than elsewhere; rest of thorax with broad black stripe each side, and pale through the middle. Abdomen blackish, the segments pale on the sides; venter pale. Legs pale yellowish, a brown line under middle and hind femora, front tibia blackish within, paler on outer side, with three faint dark spots near spines; about three tiny spines between the middle sized spines, the latter not one-third the length of the long basal spine; most of legs with minute dark dots, quite prominent on the front coxa and femur, Wings hya-

line, stigma blackish near tip, venation mostly dark, but the anterior veins, base of median and spaces elsewhere on the veins are pale; only six cells in the middle row. Expanse 23 mm.

*Type*.—♂. From Pusa, Bengal, India, June.

**Mantispa greeni** n. sp.—Pale; a brown stripe on the face, spot on the labrum, a spot on each side behind on vertex; antennae brown, basal joints pale, a pale band of three joints near tip; pronotum brown, thorax dark, a faint pale median line; legs pale, a brown line under femora II, femora I infuscated. Abdomen brown; wings hyaline, venation black, subcostal space and stigma brown, but a yellowish spot on apex of stigma, and a yellowish space just before it. In general structure like *M. indica*, the pronotum the same, and faintly transversely wrinkled. The wings rather long; the radial sector with six or seven branches, the marginal forks mostly with long pedicels. Expanse 22 mm.

*Type*.—♀. From Kandy, Ceylon, 12th June (Green).

**Mantispa indica** var. **spilonota** n. var.—Pale; brown stripe on face, spot on labrum, two or four spots on vertex; antennae dark brown, basal segments pale; pronotum brown, a pale transverse band across the swollen anterior part; meso- and metanotum brown, scutelli yellow, mesonotum with a yellow band and a broad yellow spot in front; pleura yellow, with two dark brown stripes. Coxae mostly black, rest of legs pale, except anterior femora which are more or less infuscated. Abdomen black, with clear yellow band on base of each segment, above and below. Wings hyaline, venation black, cubitus yellow at base, subcostal area and stigma brown. Structure similar to *M. indica*.

*Type*.—♂. From Kandy, Ceylon, 12th and 13th June (Green).

#### CALOMANTISPA n. gen.

Two claws to tarsus I; wings rather short, axillary vein forked, fore-wing with one complete series of gradate veinlets and one or two of a second (inner) series; stigma very short, not extending toward the base, two or three crossveins between subcosta and radius near base of wing. Head broad, face about twice as wide as eyes; antennae wide apart at base; pronotum short. Median vein of fore-wing united for a short distance to the radial sector.

This genus differs at once from all related Mantispidae by the very short stigma, as well as by the condition of the median vein of the fore-wings.

**Calomantispa spectabilis** n. sp.—Face yellowish : vertex black, leaving a little yellow each side ; antennae black, a pale band of about three segments near the tip ; pronotum reddish, black spot on middle behind ; thoracic notum black, a pale spot each side on mesonotum, and fainter on metathorax ; pleura with black, brown and yellow spots ; abdomen with broad black stripe above on first five segments, then red for two segments, and apex black ; below black is a yellow stripe, dark below this, and the venter is pale yellowish ; legs yellowish, banded with black, coxae with black spots, middle and hind femora black near base and at tip ; hind tibiae mostly black ; anterior coxae black at tips ; femora mostly black, with two oblique pale stripes on outer side and pale below, tibia black at base, before middle, and at tip. Wings hyaline ; basal part of fore-wings rather yellowish, extending out further below radius ; venation, except basal part, black ; stigma black, base yellowish ; hind-wings like fore pair, except base is not yellowish so far out. Antennae rather flat, hairy, pronotum short, about twice as long as broad in front, with several transverse grooves and rather rugose with short black bristles. Venation as figured. Expanse 16 to 22 mm.

*Type*.—♂. From Herberton, Queensland, Australia, 9th January to 7th February (Dodd).

Some specimens show a dark spot below radius toward base.

**Calomantispa spectabilis** var. **nigrata** n. var.—Almost wholly black on body and legs ; anterior coxae pale, and pale spots on front of mesothorax below ; three segments of abdomen red above (instead of two) ; pronotum with triangular red spot in front, and red spot on middle of face ; wings with base jet black extending out below radius to near middle of wing, beyond is a dark spot on hind border, a black cloud below stigma, and one on cross-vein before latter ; hind-wings blackish at extreme base, and on middle of hind margin, and spot below stigma ; stigma in both pairs black, otherwise as type.

*Type*.—♀. From Herberton, Queensland, Australia, 27th January, 5th February (Dodd).

**Calomantispa spectabilis** var. **maculata** n. var.—Body and legs mostly as in typical form, but more black ; pronotum hardly black behind ; femora I black, but with two oblique stripes outside, legs more black than in type. Abdomen black, with three segments red above as in *C. spectabilis nigrata*. Wings on base reddish for nearly one-half way out, except subcostal area ; the red has two black spots on outer edge, and one below radius toward base ; black mark below stigma, and one on middle of hind border of wing ; hind-wing fuscous on extreme base, black mark below stigma and on hind margin near middle ; in one specimen the lower black spot on the outer border of the red is extended basally in a band.

*Type*.—♀. From Herberton, Queensland, Australia, 20th January, 5th February (Dodd).

### HEMEROBIIDAE.

The family may be divided into four subfamilies; the Dilarinae on account of female ovipositor and pectinate antennae of the male; the Psychopsinae on account of the union of the subcosta, radius, and radial sector; the Osmylinae on account of the union of subcosta and radius near tip of the wing, and the Hemerobiinae for the others.

#### TABLE OF GENERA OF OSMYLINAE.

1. A distinct recurrent vein, giving off branches; cross-veins (except costals) without bristles; body thick and heavy; in fore-wings cubitus is forked near base, median a little way out (Polystoechotini) ..... 2.  
No recurrent vein..... 4.
2. With many cross-veins besides the gradate series; a large planula between claws ..... **Ithone**.  
Hardly any cross-veins except the gradate series..... 3.
3. Wings plainly falcate at tips..... **Ormiscocerus**.  
Wings hardly falcate at tips..... **Polystoechotes**.
4. Wings practically without cross-veins, except the gradate series... 5.  
Wings with many cross-veins besides the gradate series, and all bearing bristles..... 8.
5. Outer margin of fore-wings distinctly emarginate; cross-veins with bristles; hind-wings with a fork to cubitus that runs very close to the hind margin (*Berothini*) ..... 6.  
Outer margin of fore-wings not emarginate; cross-veins not bristly (*Sisyriini*)..... 7.
6. Radial sector at base connected to median; five branches to radial sector ..... **Lomamyia**.  
Radial sector not connected at base to the median ..... 19.
7. Radial sector with three branches before stigma; no outer gradate veins..... **Sisyra**.  
Radial sector with but one branch before stigma; some outer gradate veins ..... **Climacia**.
8. In hind-wings the cubitus has no fork running parallel to it. (*Nymphini*) ..... 9.  
In the hind-wing the cubitus has a long fork running parallel to it for a long distance (*Osmylini*)..... 14.
9. Beyond end of cubitus in the hind-wing are several rows of cells..... 10.  
Beyond end of cubitus in hind-wing but one row of cells..... 11.

10. In hind-wing two rows of cells between cubitus and hind margin.  
**Nymphes.**

In hind-wing but one row of cells between cubitus and hind margin ..... **Nesydrion.**

11. Basal costal space narrow, the costals mostly simple, median forked toward base.....12.  
Basal costal space very broad, the costals mostly forked; basal joint of tarsi very short, not longer than second .....13.  
12. Basal tarsal joint not longer than the second.....**Osmylops.**  
Basal tarsal joint much longer than the second joint.

**Spilosmylus.**

- 13.—In the fore-wings the median vein is forked near the base; one basal subcostal cross-vein; in hind wings a branch of the anal vein runs parallel to the cubitus for a short distance.

**Nymphydron.**

In the fore-wings the median vein is not forked near base; several subcostal cross-veins ..... **Myiodactylus.**

14. Median vein of fore-wings forked near base.....15.  
Median vein of fore-wings not forked till much beyond the middle, the empodia forked.....17.  
15. Fore-wings with outer margin plainly excised; ocelli present; empodia forked ..... **Kempynus.**  
Fore-wings not plainly excised on outer margin .....16.  
16. No ocelli; empodia forked; wings slender..... **Osmylinus.**  
Ocelli present; empodia entire..... **Osmylus.**  
17. Fore-wings with many subcostal veins; the cubitus and its fork strongly curved toward the tip..... **Porismus.**  
Fore-wings with only a basal subcostal cross-vein; the cubitus and its fork but slightly, if any, curved near tip ..... 18.  
18. Median vein of hind-wings not forked near base; antennae very long; fore-wings rather slender..... **Gumilla.**  
Median vein of hind-wings forked near base.....20.  
19. Four or five branches to the radial sector..... **Berotha.**  
Eight branches to the radial sector..... **Isocelipteron.**  
20. The median vein of fore-wings forks just above where the branches of cubitus turn down to go to the margin; the upper cubitus not there forked..... **Austrosmylus.**  
The median vein of fore-wing is not forked till further out, while the upper branch of the cubitus is forked at the turn.

**Stenosmylus.**

**NYMPHYDRION** n. gen.

Wings very densely veined, and entire middle areas filled with cross-veins. Costal area of fore-wings very broad, the costals mostly forked, no recurrent vein; in hind-wings the cubitus has no fork running parallel to it, but there is a

branch of the anal vein running out some distance, beyond end of cubitus in the hind wing but one row of cells; in forewings one basal subcostal cross-vein. Pronotum extremely slender in front, almost pointed; legs with very long hairs; hind tibia very much longer than femora; all tarsi extremely short, basal joint no longer than second or third.

*Type*.—The following species:

**Nymphyrion delicatum** n. sp.—Pale; pronotum with a faint, darker median stripe; antennae with black hair; scutelli and anterior lobes of both meso- and metanotum blackish; abdomen with black spot above on each segment. Wings hyaline; forewings with five black clouds, four of them on origin of four branches of radial sector, and one on the stigma; a fainter dot behind stigma, and one on origin of first branch of the radial sector, and another on the last veinlet connecting the radial sector and radius, near tip of wing. Venation pale, a number of cross-veins partly dark, and the forkings of costal veinlets dark; a reddish spot at extreme base of costal area. Hindwings with entirely pale venation, except on the stigma is a faint mark, and one on last connecting veinlet between radius and radial sector, and a faint reddish dot at base of costal space. Apex of both wings acute; in shape like *Nesydrion*; a few cross-veins beyond end of radial sector in both pairs. Expanse 55 mm.

*Type*.—♀. From Herberton, Queensland, Aus. (Dodd).

**Nesydrion pallidum** n. sp.—Pale yellowish; a median black spot on face, a black line between antennae, vertex with two dark longitudinal stripes, connected in front to a shorter, median black line, behind with a black spot each side; antennae brown, with short black bristles; pronotum pale, with a faint broad stripe through middle; thorax and legs pale; abdomen brownish above and toward the tip. Body and legs with long white hair. Wings hyaline; venation wholly pale yellowish, stigma hardly indicated, some veins, in certain lights are darker. Wings long, about the shape of *N. diaphanum*, but the costals more numerous; radial sector in hind wings arises nearer base than in that species, and the hind wings are rather broader in the middle, so that a number of the veinlets from median are forked three times before margin; in both wings the radial sector has ten branches. Expanse 65 mm.

*Type*.—♀. From Herberton, Queensland, Australia, 5th February (Dodd).

**OSMYLOPS** n. gen.

Differs from *Myiodactylus* in the narrow costal area of fore-wings, practically all the costals being simple; more densely veined than in *Spilosmylus*. There are no ocelli, but a flat tubercle somewhat resembles one. In hind-wing the cubitus has no long fork running parallel to it, and beyond the end of cubitus are several rows of cells. The tarsi are very short, the first tarsal joint no longer than second or third, the legs very fairly densely haired.

*Type*.—*Myiodactylus placidus* Gerst. Includes also *Nymphes sejunctus* Walk.

**SPILOSMYLUS** Kolbe.

*Type*.—*Osmylus africanus* Kolbe.

*Lysmus* Navas is a synonym of this genus.

***Spilosmylus triseriatus*** n. sp.—Pale; vertex rather darker behind; pronotum dark in front; abdominal segments dark on tips. Wings hyaline; venation pale, marked with black; radius and subcosta each with five black streaks and at the same places are five black lines in the subcostal area (as McLachlan describes for his *O. interlineatus*); many costals with dark spot before margin, many cross-veins in basal middle part of wing are wholly dark, fewer near tip; a dark dot on the yellowish stigma; on hind margin beyond end of cubitus (in male) is a large flat, rounded, yellowish tubercle, with six black spots on its edge, and the veins across it dark. Venation of hind-wings almost wholly pale, but the outer gradates and some inner cross-veins are dark. Expanse 35 mm.

*Type*.—♂. From Herberton, Queensland, Australia, 30th January, 3000 feet (Dodd).

**OSMYLINUS** n. gen.

In general similar to *Osmylus*, but the empodia are forked; there are no ocelli, although there are some smooth tubercles the costal cross-veins are more numerous than in *Osmylus*.

*Type*.—*Osmylus longipennis* Walk.

**KEMPYNUS** Navas.

Venation as in *Osmylus*, but empodia deeply bilobed, and the outer margin of fore-wings is plainly excised; the costal cross-veins are very numerous and often forked; the median vein of fore-wings forks beyond the origin of first branch of the radial sector; ocelli present.

*Type*.—*Stenosmylus incisus* McLach. Includes also *St. citrinus* and *St. stellae*.

#### AUSTROSMYLUS n. gen

Similar to *Stenosmylus*, but the median vein is forked as stated in the generic synopsis, while the cubital branches are simple; ocelli present; empodia forked; costals very numerous.

*Type*.—*Osmylus pulverulentus* Gerst.

#### STENOSMYLUS McLach.

*Type*.—*Osmylus tenuis* Walk. Includes also *O. pallidus*, *St. stenopterus* and *Nymphes extraneus* Walk.

#### OSMYLUS.

*Dictyosmylus* and *Hyposmylus* are based on the same character, the crossed costals; but this is variable, and several species described in *Osmylus* have one or two costals crossed. *Parosmylus* was based on the presence of a spur on coxa I, this spur is present in the types of *Hyposmylus* and *Dictyosmylus*, also in *Osmylus nubeculosus* (Paris Museum) which is apparently the same as *D. lunatus*. Moreover this spur is present in the female of *Osmylus maculatus*, the type of *Osmylus*. *O. punctipennis* Walk. is a *Hyposmylus*, and has the spur on coxa I. Therefore since the characters used for these genera break down I consider they are synonyms of *Osmylus*, at least until better characters are presented.

***Sisyr* bakeri** n. sp.—Head clear yellow, vertex with a dark cloud on middle, three basal joints of antennae yellow, rest dark brown; thorax and abdomen brown; legs clear yellow, unmarked; wings nearly uniform dark brown, darker on costal area and at tip. In fore-wings eleven costal cross-veins, the last two widely separated, radial sector with three branches, and connected back to the radius three times, a cross-vein from base of second branch of radial sector to the first branch of radial sector; the apical forks of radial sector and its first branch are of equal length; the cubito-anal cell is hardly three times as long as broad. In hind-wings the apical forks of the radial sector and of its first and second branches are all of equal length. Expanse 8 mm.

*Type*.—♂. From Los Banos, Philippine Islands (Baker).



## HEMEROBIINAE.

In the following table are included all the genera known to me at present; but I am aware that there are others as yet undescribed in several collections. It is quite probable that some of these may be united later, as the number of radial sectors and some other characters used to separate them are hardly sufficiently constant to be relied upon for generic separation.

1. No recurrent vein at base of fore-wings..... 2.  
A recurrent vein present..... 9.
2. Fore-wings coriaceous, divided up by numerous cross-veins into little squares; hind-wings absent .....**Nesothauma**.  
Fore-wings not coriaceous, nor densely reticulate..... 3.
3. Fore-wings with three or more radial sectors, and two or three rows of gradates..... 4.  
Fore-wings with but two radial sectors ..... 6.
4. Outer margin of fore-wing excised.....**Nesomicromus**.  
Outer margin entire..... 5.
5. Hind wings rudimentary.....**Pseudopsectra**.  
Hind-wings normal; the branches of upper cubitus in hind wings run into a vein parallel to hind margin.....**Micromus**.
6. No gradates in fore-wings, no cross-veins in hind-wings.  
**Sisyrella**.  
Some gradates in the fore-wings ..... 7.
7. Costals mostly simple; cubitus in fore-wings not forked near the base .....**Neurorthrus**.  
Costals mostly forked; the cubitus in fore-wings forked near base..... 8.
8. Several outer gradate veins; body and legs very hairy; female with a short ovipositor.....**Nosybus**.  
No outer gradates in fore-wing; no ovipositor; hind wings often rudimentary.....**Psectra**.
9. Basal part of wing reticulate; costal area reticulate; cross-veins between radius and subcosta numerous .....**Gayomyia**.  
Basal part of wing not densely reticulate .....10.
10. No series of cross-veins in the hind-wings; but two radial sectors .....11.  
A series of cross-veins in hind-wings.....12
11. Fore-wings with four preapical cross-veins .....**Symphorobius**.  
Fore-wings with but one preapical cross-vein.....**Notiobiella**.
12. But one radial sector with several branches; cross-veins numerous and irregular.....13.  
Two or more radial sectors; cross-veins in more regular series...14.

13. Costal area very broad, costals crossed ; median fork not running into the cubitus.....**Rapisma.**  
 Costal area rather narrow, costals not crossed ; median fork runs into the cubital vein .....**Oliarces.**
14. Outer margin of fore-wings plainly excised ; five or more radial sectors.....**Drepanepteryx.**  
 Outer margin not plainly excised.....15.
15. A connecting veinlet between the first radial sector and the median before middle of wing, above the cross-veins from cubitus to median and to anal, thus forming a basal gradate series.....17.  
 No such connecting veinlet, but often one from median to radius before the origin of the first radial sector.....16.
16. At least five radial sectors ; wings very broad.....**Megalomus.**  
 From two to four radial sectors ; wings much narrower.  
**Hemerobius.**
17. Six or more radial sectors ; wings very broad ; three gradate series.  
**Neuronema.**  
 Not more than four radial sectors.. .....18.
18. But one series of gradates beyond middle of fore-wings.  
**Carobius.**  
 Two series of gradates beyond middle of fore-wings .....19.
19. Fore-wings plainly acute at tip ; each radial sector connected three times to the next.....**Megalomina.**  
 Apex of fore-wings rounded.....20.
20. Outer gradate series reaching obliquely backward to before middle of hind margin.....**Psychobiella.**  
 Outer gradate series not reaching back to middle of wing.  
**Boriomyia.**
- Sartena*=**Neurorthus.**  
*Stenolomus*=**Megalomus.**  
*Nemis*=**Micromus.**  
*Hemerodomia* and *Niremberge*=**Boriomyia.**  
*Annandalia*=**Notiobiella.**  
*Spadobius* and *Palmobius*=**Symphorobius.**

#### GAYOMIA n. gen.

Distinguishable from other Hemerobiidae by the densely reticulate basal and costal parts of wing ; many cross-veins elsewhere quite irregular ; recurrent vein present ; many cross-veins between the radius and subcosta in fore-wings ; in fore-wings at least five radial sectors, the fifth with five or more branches ; in hind-wings with two radial sectors, the first running up to the second and then away, and with

one branch, the second with six branches; hind wings with two gradate series.

*Type*.—*Megalomus falcatus* Blanchard; *M. sticticus* Blanchard also belongs to the genus; both are from Chili.

#### **RAPISMA** McLachlan.

This is the largest Hemerobiid, green in color; the antennae are fully two diameters of basal joint apart; costals crossed and forked; many cross-veins on wings not arranged in regular series; but one radial sector, which has seven branches; in both wings the median vein soon forks, and the cubitus forks near base. There is a brownish specimen in the old Westermann collection which may be a new species.

#### **SISYRELLA** n. n.

*Nopia* Navas, 1911 (nec Walker, 1862).

*Type*.—*Nopia nikkoana* Navas.

#### **NEURONEMA** McLachlan.

The type species has seven radial sectors, the first forked, next five simple, the last with five branches; in hind.wings two radial sectors, the second with nine branches. The costal area of fore-wings is very broad and the costal cross-veins are forked; in fore-wings three series of gradate veinlets, in hind wings two series of gradates. It is related to *Drepanepteryx*.

**Hemerobius greeni** n. sp.—Yellowish; dark brown stripe under each eye toward the mouth, sides of pronotum brown, abdomen brownish. Wings pale, lightly infuscated by narrow irregular bands across veins, brown dots and streaks on veins, more prominent spots at origin of the three radial sectors, and on veinlet connecting median and cubitus and reaching downward along cubitus, gradate series dark, outer margin with dark dots in groups of three or four. Venation of hind wing mostly pale, gradates dark, and some veins beyond them, and a few dark veinlets near end of anal vein. Fore-wings moderately broad, about as in *H. humuli*, three radial sectors, inner gradate series quite regular, of six or seven veinlets, the last a trifle nearer base than the preceding one; outer gradate series of about seven, rather irregular, and connecting the branches beyond the forks; hind wings with about six gradates in outer series. Male appendages furcate, superior process acute curved toward the other appendages.

*Type*.—♂. From Pattipola, Ceylon, 21st May (Green).

**Notiobiella mexicana** n. sp.—Yellowish; third joint of antenna dark brown; pronotum slightly dark on front border. Wings with most of the forks dark, and the gradates and some other cross-veins dark brown, and a spot at the origin of the first radial sector; stigma pinkish or yellowish. Pronotum very much narrowed in front; wing nearly two and a fourth times as long as broad, first sector arises near the base, the second beyond the middle of wing, and with two branches; stigma of hind-wings dark at base, not much swollen on costa, radial sector with two branches quite close to each other at their origin. Expanse 16 mm.

*Type*.—♂. From Guadalajara, Mexico (McClendon).

**Notiobiella affinis** n. sp.—Closely related to *N. (Hemerobius) iniquus* of Ceylon. Pale yellowish, marked with brown; last joint of palpi brown; pronotum dark brown each side leaving a narrow pale median s;ripe; rest of thorax with pale brown spots; legs pale yellow; wings yellowish hyaline, the veins with pale brownish spots and a large dark brown trifid mark near base as in *N. iniquus*; the gradates are marked with a faint brown cloud. In fore-wings the fork of the second radial sector is as far out as the fork of the radius just above it (in the *N. iniquus* this fork is much longer). In hind wings the veins near margin and beyond middle of wing are marked with brown. Six veinlets in the middle gradate series of the fore-wings, the third farther out than the second; fore-wing about two and a fourth times as long as broad. Expanse 10 mm.

*Type*.—♀. From Manila, Philippine Islands.

**Notiobiella viridinervis** n. sp.—Green; head yellowish-green; antennae yellowish; legs greenish-yellow, hind tibia with two dark green narrow bands close together near the middle; tips of palpi brown. Wings hyaline, venation green, a faint cloud near hind margin near end of the anal vein. Wings about two and a fourth times longer than broad, costal area at its broadest about one-third of the width of wing; two radial sectors far apart, the first near its base connected to median, and the second near its base connected to the first. One gradate series near middle of wing of four veinlets; median and cubitus connected three times, once at the gradate series; stigmal area has veinlets closer together than elsewhere. In the hind-wings the stigmal area is swollen on costal margin. The pronotum is much broader behind than in front, with an oval area each side behind the middle, marked by deep furrows: antennae about as long as width of wing; male appendages very large, subtriangular plates. Expanse 14 mm.

*Type*.—♂. From Trincomali, Ceylon, 4th September (Green).

**Dilar hermosa** n. sp.—♀. Pale, head dark on vertex, dark spots on sides of the pronotum, also on the meso- and metanotum; abdomen swollen, each segment with transverse brown spots bearing tufts of hairs; legs very hairy, especially tibia I. Wings with numerous transverse pale brown marks, those in middle apical part rather smaller than elsewhere, and more connected; about ten or eleven costal spots; two large ones just before middle of the wing, one behind radius and almost connected to the one on the hind margin, before them a transverse band devoid of spots; hind wings (besides numerous other spots) with three along the inner margin, and about seven in costal area. Wings very broad, outer margin of both pairs hardly excavate in middle, costal cells three or four times as long as broad, many costals forked, but some simple ones here and there; radial sector connected to radius three time before apical third; six branches of radial sector in fore-wings, five in hind wings; a black dot between first and second branches in both wings; in fore-wings upper branch of cubitus with three or four branches; in fore-wings the branches of radial sector are bifurcated or a few trifurcate before the marginal forks, in hind-wings some are bifurcate others simple; entire margin of both pairs with short intercalated veinlet between all other veins; margins of wings and the veins with long hairs, the posterior fringe is extremely long. Expanse 25 mm.

*Type*.—♀. From Pacho, Colombia, E. Cordilleras, 2200 m., October (Fassl). It belongs to the subgenus *Nallacius* of Navas.

#### CONIOPTERYGIDAE.

**Malacomyza terminalis** n. sp.—Densely clothed with white powder, cilia white. Antennae white on basal seven joints, beyond deep black; palpi black on base, white on last joint; body brownish, with white powder. Fore-wings with cross-vein just before fork of the median vein; radial sector geniculate at base; in hind-wings but one fork. In the male the antennae are thick, the basal joint enlarged at tip, and seen from the side with concave upper edge; on the head of male is a swollen cap or top piece; in the female the head is normal, and the basal joint of antennae long, but not enlarged at tip; legs with fusiform tibiae. Expanse 4 mm.

*Type*.—♀. From Belgaum, Bombay Province, India, 12th August, 2500 feet.

#### CHRYSOPIDAE.

**Chrysopa zeylanica** n. sp.—Yellowish; face with a prominent brown inverted Y-mark, the stem going up between the antennae on the vertex, the forks reaching down to clypeus; a dark spot under each eye; palpi mostly dark; antennae pale, basal joint with brown stripe on outer side and one on the upper side; second joint pale, but

the next four or five joints nearly black; pronotum nearly twice as broad as long, hardly narrowed in front, with broad brown stripe on each side margin continued back on rest of thorax above the base of wings, a brown spot on each side of scutellum; abdomen dark; legs pale, extreme tip of tarsi brown. Wings pale, veins mostly pale; costals dark at ends, many marginal veinlets dark, on outer margin alternating with the pale veins; an oblique streak across the costal area near base; the gradate series and the cross-veins between radial sector and radius faintly margined with brown; base of radial sector and the cross-vein to median vein black, the stigma also dark, but short; a dark spot in the fork of the cubital branch. Hind-wings with some costals and most of the marginal veinlets dark, stigma dark, and a very dark spot over origin of radial sector, a cloud below stigma, and a larger cloud behind it on the hind margin. Wings slender, acute at tip, cells large and few; four inner gradate veinlets, six outer, inner series twice as near to outer as to the radial sector; eight cross-veins between radius and the radial sector; divisory veinlet of the third cubital cuts off only a very small cell. In hind-wings the inner gradate series of three, and outer of five veinlets. Expanse 24 mm.

*Type*.—♂. From Kandy, Ceylon, May (Green). In general appearance similar to *Ch. conradtina* Navas.

**Nothochrysa aequalis** Walk.—Face yellowish; antennae black, except the basal two joints reddish-yellow; anterior margin of vertex rather reddish, rest yellowish; thorax yellowish, pronotum much broader than long, anterior margin very strongly convex, a median groove, color yellowish, with anterior margin dark brown, and a broad brown band across over the transverse furrow; anterior lobe of mesothorax black in front, lateral lobes with black spot, and some black in the middle before the scutellum; metathorax dark, but with two pale submedian approximate spots. Abdomen dark at base, beyond pale, spotted with dark, the segment near tip each with an apical median and lateral dark spots; ventral segments banded with dark; legs pale, all femora with preapical blackish band, that on hind femora very broad. Wings long and slender, hyaline, with yellowish venation, unmarked, and long greenish stigma; about 10 veinlets in each gradate series. Length 22 mm.

From Chapra, Bengal, India (Mackenzie).

#### MYRMELEONIDAE.

**Brachynemurus fenestratus** n. sp.—Yellowish; a median dark dot on the face, dark mark below each antennae, a large dark mark above antennae, not sharply defined, vertex with two dark marks each side; tips of palpi dark; antennae short, strongly clavate, annulate. Pronotum much longer than broad, with two dark dots on the front margin, and a stripe each side much broader behind; thorax with

spots and streaks on sides, but the scutelli wholly pale. Abdomen pale on base, blackish beyond middle, not longer than the wings in either sex, in male the last segment is very short, not nearly as long as the long and slender appendages. Legs pale, with dots at base of the black bristles; anterior femora dark above near tip; spurs but little longer than the first tarsal joint. Wings hyaline; longitudinal veins interruptedly marked with white and black, the cross-veins all strongly dark and most of them almost margined with dark, so they are very prominent; a dark spot at base of stigma, and another at the end of the cubitus in both pairs; apical, submarginal forks slightly darkened. Wings moderately broad; four to six cross-veins before radial sector in the fore-wings, three or four before radial sector in hind-wings, eight branches of the radial sector in both pairs; a few costals before stigma forked; cubitus forks before the first branch of radial sector; in fore-wing the anal runs out parallel to the hind margin for nearly one-third of wing length; venation generally very dense. Expanse 55 mm.

*Type*.—♂. From rice fields Turricares, Costa Rica, December (Tristan).

#### INDOLEON n. gen.

Wings long and subfalcate at tip; costals simple; radial sector arises much beyond the cubital fork, ten cross-veins before it, one in the hind-wing before radial sector; no line of bent veins through apex of wings. Antennae long, not diameter apart at base; pronotum slender; legs slender, spurs little longer than the first tarsal joint, fifth tarsal joint longer than the first.

*Type*.—*Myrmeleon tacitus* Walk. Probably includes also *Myrmeleon insignis* Rambur, which also has ten cross-veins before radial sector in fore-wings. This genus is allied to *Episalus* and *Periclystus*, but differs in that the radial sector arises much farther out, and no line of bent veins in apex of wing.

*Myrmeleon berenice* n. sp.—Face yellowish, a large inter-antennal mark black, vertex with two transverse rows of three dark spots, the middle one of the front row double; pronotum pale, with three dark stripes, the lateral sometimes incomplete, meso- and meta-notum mostly dark, but pale behind, pleura partly pale, legs pale, hind tibia dark within, other tibiae and tarsi sometimes infuscated; abdomen dark, sides with pale stripe, tips of segments narrowly pale. Wings hyaline, veins pale, indistinctly dotted if at all, subcosta with dark spaces, stigma pale. Pronotum broader than long, a little nar-

rowed in front, anterior corners rounded. Tibial spurs not as long as first tarsal joint, middle tarsal joints not very short, the second but little shorter than the first. Wings long, slender, acute at tips; radial sector of fore-wings arises near middle of wing, beyond end of the anal vein, about 12 cross-veins before radial sector, in hind-wings about 8 cross-veins before sector, in both wings with 9 branches to radial sector; about 37 costals before stigma, all simple. Expanse 50 mm.

*Type*.—♂. From Trincomali, Ceylon, 4th September (Green).

**Myrmeleon clothilde** n. sp.—Yellow; head with large black interantennal mark, and covering vertex, latter shows two pale spots behind, and a fainter transverse spot each side on top; basal joint of antennae pale above; pronotum dark, anterior lateral corners pale, and perhaps a pale mark on each side; thorax dark, bordered behind with pale; abdomen dark, legs pale, femora dark on tips or apical half, tibiae black within, tarsi black, paler on bases of joints. Wings hyaline, all cross-veins pale, dotted with dark; most of the longitudinal veins with dark spaces, stigma faintly dark. Pronotum very broad, but little narrowed in front. Tibial spurs a little longer than first tarsal joint, middle joints very short, fifth as long as second, third and fourth together; wings long and slender, acute at tips, about 7 cross-veins before radial sector in fore-wings, about 5 in hind-wings; 9 branches to radial sector in both pairs; hind-wings with costal margin swollen near base; about 45 costals before stigma in fore-wings, only one or two forked. Expanse 64 mm.

*Type*.—♂. From Pusa, Bengal, India, June.

#### COMPSOLEON n. gen.

Antennae diameter apart; pronotum twice as long as broad. Legs slender, tibia about as long or longer than femora; no spurs, basal tarsal joint longer than the second, fifth equal to third plus fourth. Wings slender; hind wings longer than the fore-wings; in hind-wings one cross-vein before the radial sector, in fore-wings four such cross-veins; costals simple; a single series of anal cells.

*Type*.—*Myrmeleon occultus* Walker.

#### GLENOLEON n. gen.

The radial sector arises before the fork of the cubitus in fore-wing; three cross-veins before radial sector in fore-wing, one in hind-wings; in hind-wings the anal does not run parallel to cubital fork, but bends down to margin, or



up to the fork. In the median apical part of fore-wings the veins tend to form a straight line; legs slender, spurs as long as two joints.

*Type*.—*Glenurus pulchellus* Walk.

I erect this genus for the Australian species of *Glenurus*, which differ much from the American species, especially in position of radial sector, and in the apparent straight line in apical part of wing.

The species I have seen may be tabulated as follows :

- |   |                     |
|---|---------------------|
| 1. Two complete bands across hind-wings.....  | <b>pulchellus.</b>  |
| Not two complete bands .....  | 2.                  |
| 2. Hind-wings with distinct black spots.....  | 3.                  |
| No distinct spots, only minute dots .....   | <b>indecisum.</b>   |
| 3. In hind-wing four cross-veins below radius are marked with black,<br>also spot at stigma and spot opposite on hind margin. |                     |
|   | <b>radialis.</b>    |
| No marks along radius on hind-wing.....   | 4.                  |
| 4. Hind-wings with large spot beyond stigma and a band (perhaps<br>broken) before.....  | <b>dissolutus.</b>  |
| No spot beyond stigma, but one before.....  | 5.                  |
| 5. No spot or cloud in hind-wing except the spot by stigma.   |                     |
|   | <b>stigmaticus.</b> |

Besides the stigmal spot, a cloud or broken in two spots, wings narrow ..... **falsus** (*meteoricus*).

**Glenoleon radialis** n. sp.—Head pale, a large interantennal black mark, which is connected on the middle below to a large transverse dark spot on clypeus; vertex dark, darker margined in front, and behind showing as three transverse spots; pronotum dark with faint median and lateral streaks, thorax dark, marked with dark gray, and with some pale spots; abdomen black; legs with black femora, tibia with apical black band, and fore and middle tibiae with median and sub-basal bands also; basal part of first tarsal joint pale, rest black, spurs longer than first joint. Wings hyaline; venation marked with dark streaks, the cross-veins not dotted, but either all or partly black, or all pale. In fore-wings there is a dark spot at the stigma, and small spots beyond it along the costa; behind the radius are five dark spots, four on cross-veins, the other on origin of radial sector, one of the marked cross-veins is before the radial sector; also a spot at inner base of stigmal spot; about eight or ten cross-veins between medius and cubitus are broadly margined with black; an oblique mark at the union of median and cubital veins, and two oblique streaks from near this mark to the hind margin; an oblique streak up from end of anal vein, and a number of other cross-veins dark, and

dark dots in apical part of wing. In hind wings the origin of the radial sector and four cross-veins beyond are broadly margined with dark, the last under the dark stigmal mark, behind the stigmal mark is a larger mark on the hind border and beyond this is a streak and several subapical spots. Wings rather broad, especially at the stigma, fully as broad as in *G. pulchellus*; the costals, except a few near stigma, almost all simple; ten branches of radial sector; in fore-wings the anal is connected four times to the fork of cubitus, in hind-wings only once or twice. Expanse 74 mm.

*Type*—♀. From Port Darwin, Australia, 12th May (Dodd).

**Glenoleon indecisum** n. sp.—Face pale; a broad shining black band below and another above the antennae, vertex dull black, leaving pale band between it and the band above antennae; antennae pale, darker on tip; pronotum dark, a pale line through the middle, and less regular pale stripe each side; rest of the thorax blackish, marked with dark; pleura pale, with a broad black stripe under the wings; legs pale, femora I banded near middle and tip, femora II and III at tip; tibia I with broad band near base, tibia II mostly dark, tibia III faintly dark at tip; tarsi I and II black, except base of first joint, III mostly pale. Abdomen dark, with pale spot before middle of segments. Wings hyaline, venation black, with long white streaks, the subcosta with short black and white spaces; some cross-veins wholly or partly pale; about four dark spots in subcostal area, and one below radius near stigma, one on stigma; outer gradates clouded to form a rather irregular oblique streak, fork of cubitus and several spots beyond dark, and smaller spots especially along the outer border of wing. Hind-wings with spots along outer and apical border, and on the last two veinlets connecting radius and radial sector. Structure similar to *G. pulchellus*. Antennae long, slender, pronotum longer than broad; legs slender, tarsi and the claws and spurs as in *G. pulchellus*. Hind-wings narrower and as long as fore-wings; most of costals in fore-wing (except basal ones) forked; three cross-veins before radial sector, in hind-wings one before radial sector, ten branches to radial sector in each wing; in fore-wings there is no apparent curved vein bending up from the fork of cubitus where the anal runs into the cubital fork (present in *G. pulchellus*). In the hind-wings (being narrower) the anal runs out farther than in *G. pulchellus* and there is not so much space between the cubitus and the hind margin; the tip of the wing is also more nearly falcate than in *G. pulchellus*. Expanse 37 mm.

*Type*.—♀. From Herberton, Australia, 5th and 8th January (Dodd).

The genera of Myrmeleonidae known to me to occur in South America may be tabulated as follows :

1. In the hind-wings the cubitus is not distinctly forked, the anal bending up runs out in a long curve; palpi very long and slender; antennae well separated at base.....**Dimares.**  
In hind-wings cubitus is plainly forked, and anal makes no long curve outward..... 2.
2. In hind-wings but one cross-vein before the origin of the radial sector ..... 3.  
In hind-wings two or more such cross-veins ..... 9.
3. In both wings the fork of cubitus is parallel to it, and anal to both cubitus and its fork; first tarsal joint barely longer than the second, spurs very short.....**Dimarella.**  
Forks of cubitus divaricate, anal not parallel thereto..... 4.
4. Many costals of fore-wings crossed; radial sector arises before cubital fork; spurs but little longer than first joint.....**Puren.**  
Few if any costals crossed, some forked near stigma..... 5.
5. Basal joint of tarsus but little longer than the second; femur I rather thick; spurs about as long as two tarsal joints.  
**Psammoleon.**  
Basal joint much longer than second; femur I slender; spurs long, often one-half the length of the tarsus..... 6.
6. In hind-wings the cubitus has many equal branches direct to margin..... 7.  
In hind-wings every other branch of the cubitus is heavier and runs for a distance parallel to the hind margin; hind-wings longer than fore-wings .....**Glenopsis.**
7. Pronotum longer than broad; wings quite broad in stigmal region; hind tibia longer than hind femur..... 8.  
Pronotum broader than long; wings slender; hind tibia not longer than hind femur; costal area narrow .....**Incamoleon.**
8. Fore-wings broadest at stigma; costal area very broad, one or both pairs marked; an oblique vein up from end of anal in fore-wings.....**Glenurus.**  
Fore-wings broadest before stigma; costal area very narrow.  
**Eremoleon.**
9. No spurs; small, delicate species; anal of fore-wing ends beyond middle; wings broadest at stigma .....**Mimoleon.**  
Spurs present.....10.
10. Two or more series of cells in costal area.....11.  
Costals simple, or forked near stigma .....13.
11. Spurs strongly curved; legs thick and hairy; a line in apex of wing; antennae well separated.....**Acanthaclisis.**  
Spurs but little curved; legs moderately slender..... 12.

12. Two series of costal cells for most of distance in fore-wing ; in hind-wing but one series.....**Lemolemus.**  
 Three series of cells in fore-wing for part way, and two in hind-wings.....**Calinemurus.**
13. In hind-wings anal runs parallel to the cubital fork for a long distance ; a line in apical part of both wings, and between the cubitus and the hind margin ; antennae more than their diameter apart.....**Ameromyia.**  
 In hind-wings the anal does not run parallel to cubital fork for any considerable distance, often not more than one or two cross-veins between them .....14.
14. Antennae more than their diameter apart at base ; usually four cross-veins before radial sector in hind-wings.....15.  
 Antennae not diameter apart at base ; first branch of radial sector at or before the end of anal vein in fore-wings.....16.
15. No line in apical part of the wings, but one between the cubitus and margin in fore-wings ; first branch of radial sector arises much beyond the end of the anal vein ; spurs not much longer than first tarsal joint.....**Myrmeleon.**  
 A line in apex of both pairs of wings ; spurs as long as two tarsal joints ; first branch of the radial sector arises opposite the cubital fork.....**Amazoleon.**
16. A comb of long bristles on the outer posterior edge of coxa I.

**Austroleon.**

No such comb of bristles .....**Clathroneuria.**

*Puren Navas.*—This includes *Myrmeleon modestus* Blanch. which agrees closely with *P. bellator* Navas and probably is the same species ; there are three cross-veins before radial sector in the fore-wing.

*Calinemurus* Bks.—*Elicura* Navas agrees with this genus.

*Lincoya* Navas.—This generic name has long been pre-occupied in Zoölogy ; but the genus is perhaps the same as *Austroleon*.

*Lemolemus* Navas.—It is possible that this is the same as the North American *Brachynemurus*, at least I do not know at present how to separate them.

**AMEROMYIA** n. gen.

Differs from *Myrmecaelurus* in that in both wings the anal runs parallel to the cubital fork for a considerable distance ; first branch of radial sector arises a long distance before end of anal vein, two or three cross-veins before radial sector in hind-wings, three or four in front-wings ; costal series simple ;

a line in apical part of wings and between cubitus and hind margin; spurs present, rather short; fifth tarsal joint as long as second, third and fourth together; antennae widely separate at base.

*Type*.—*Brachynemurus strigosus* Banks. This genus includes also *Myrmeleon nigriventris* Walker, which I have seen from Argentina and redescribe it as follows:

**Ameromyia nigriventris** Walker.—Head yellowish-brown, two black spots on the clypeus, a black mark above the antennae up on front of vertex, latter paler, with black marks, a round black spot each side, a submedian pair, and a spot near each eye; antennae brown, darker toward tip, fully diameter apart at base; pronotum with a broad dark median stripe, narrowly divided in middle by a pale line, a dark stripe on each posterior side; thorax densely spotted and streaked with black, and with yellowish marks, a narrow median pale line over mesothorax; pleura with a broad white stripe under wings, below which it is dark brown or blackish. Legs pale yellowish, femora minutely dotted with black, bristles black, spurs as long as two joints of tarsus; abdomen dull black, with white hair. Wings hyaline, tinted with fuscous along base, and in subcostal and radial area; about eight black spots along lower edge of radius, from radial sector out to the stigma, latter black; about seven smaller black spots along upper edge of the cubitus, the last at the anastomosis; the veins at these black spots are black, elsewhere pale, other veins more or less marked with black, radial sector mostly dark. Hind wings tinted with dark on basal subcostal space; a few small dark spots along radius; the stigma dark, and a very plain black streak in the apex of wing; venation mostly dark, but the subcosta and radius interrupted with pale. Wings rather narrow, both pairs subfalcate and acute at tips; in fore-wings four cross-veins before the radial sector, in hind-wings three; about thirteen branches to radial sector in each wing; in fore-wings the radial sector arises much before the cubital fork, the latter runs nearly parallel to cubitus for some distance, as also does the anal vein, which ends far out in both pairs; through the radial branches is a straight line toward tip of wings in both pairs. Expanse 60 to 70 mm.

From Misiones, Argentina, also Rio Grande do Sol, Brazil.

In structure similar to *B. strigosus*, but the markings are very different. I would not have known this was Walker's species but for a sight of the type.

**INCAMOLEON** n. gen.

Pronotum broader than long; legs moderately slender, but hind tibia not longer than hind femur; spurs long and slender; wings slender, costal area narrow; one cross-vein before radial sector in hind-wings, the anal runs direct to hind margin.

*Type*.—*Psammoleon punctipennis* Bks.

*MIMOLEON* n. n.—I propose this for my *Microleon* which is preoccupied by Butler in 1885.

**GLENOPSIS** n. gen.

In general similar to *Glenurus*, but wings much more slender, and the hind wings plainly longer than the front pair; in the hind-wings every alternate branch of the cubitus is heavier than the others and is bent to run parallel for a short distance to the hind margin.

*Type*.—*Myrmeleon anomalus* Rbr.

*Glenurus mollis* Gerst. is the same species.

**AMAZOLEON** n. gen.

Antennae wide apart at base; spurs as long as two tarsal joints; first tarsal joint barely longer than the second, which is equal to the third plus fourth; no comb of bristles on coxa I; wings long and narrow; costals simple; a line through the apex of both pairs; three or four cross-veins before radial sector in both wings; in hind-wings the anal runs parallel to cubital fork for only a short distance; abdominal segments near tip swollen.

*Type*.—*Myrmeleon pubiventris* Walk.

**DIMARELLA** n. gen.

Antennae separate at base, about as far from each other as from the eyes; legs very long and slender, tarsi long, all joints several times as long as broad, second joint as long as first, fifth the longest, as long as third and fourth together, beneath with stiff bristles; claws long, but little curved; spurs weak, not as long as basal tarsal joint; pronotum about as broad as long. Wings slender, hind-wings very narrow: radial sector of fore-wings arises beyond the basal third, about seven cross-veins before it; anal, instead of running direct to margin, bends up and outward and runs

parallel to the cubital fork until middle of wing. The fork of cubitus parallel to cubitus, but one vein between them; costals simple; hind-wings with radial sector arising near base, but one cross-vein before it; anal extremely short, ending before cubital fork.

*Type*.—*Eremoleon angustus* Banks.

It also includes *Myrmeleon efferus* Walk. Readily known from other American genera by the venation. Both species have the middle tibiae much spotted with black, there being a series of bands beneath. The two species known to me are separable as follows;

- A black spot before pterostigma in fore-wings; in hind-wings two rows of cells (for most of distance) between the cubitus and the hind margin ..... *efferus* Walk.  
 No prominent black spot before stigma; in hind-wings but one row of cells between cubitus and margin; legs more slender than in *efferus* ..... *angustus* Bks.

#### ASCALAPHIDAE.

*Suhpalasca hermosa* n. sp.—Clypeus pale, above it is a band of dense black hair reaching from eye to eye, above this the face is dark; dense black hair around bases of antennae and on the vertex; antennae black at base, beyond pale, annulate with black, knob brown, antennae not reaching to the stigma. Thoracic dorsum black with fine black hair; pleura pale, with white hair; legs shining jet black, except the basal part of femora which is pale. Abdomen dark brown, with pale spot on the side of each segment. Wings almost hyaline, faintly yellowish; venation black; costal cross-veins, those before radial sector and those between radial sector and radius, are margined with brownish, and the veinlets beyond stigma and above subcosta also margined, while those between the cubitus and median show a dark spot near middle; hind wings similar to the fore-wings in markings. Tips of wings nearly acute; stigma with five veinlets; a few cross-veins before the radial sector crossed; five branches to radial sector; costal cells in fore-wing as high as long; in hind-wing some a little longer than high; three series of cells at tip beyond the stigma; cell before cubital fork in fore-wing is triangular; beyond the cubital fork are three cells; marginal cells in anal area of hind wings are much higher than broad. Expanse 84 mm.

*Type*.—♂. From Kandy, Ceylon, May (Green).

The genus *Suhpalasca* can be distinguished from *Hybris*, *Acheron*, etc., by the nature of the veining between radial sector and median near the margin of wing; in *Hybris*, etc., there are about three rows of cells nearly parallel to the me-

dian, while in *Suhpalasca* there is a row parallel to the radial sector, or rather its branch, and below it the venation is more irregular.

### PANORPIDAE.

The genera of Panorpidae may be arranged in the following groups and tabulated as below :

1. Head deflected under pronotum ; eyes nearly connate above ; no ocelli ; costal area of fore-wings with many veins ; each tarsus ends in two small claws ..... **MEROPEINAE**—3.  
 Head prominent from above ; eyes widely separated above ; costal area of fore-wings with few veins..... 2.
2. No ocelli ; wings rudimentary ; tibial spurs very weak ; each tarsus with two small claws ; female with long corneous ovipositor.  
**BOREINAE**—4.  
 Ocelli present ; tibial spurs distinct.....**PANORPINAE**—5.
3. Anal area and rest of fore-wings with many cross-veins forming several rows of cells ; legs very bristly ; subcosta and radius run close together for some distance and then both fork ; antennae slender ..... **Notiothauma**.  
 Anal area with few cross-veins ; legs with only apical bristles ; antennae thickened ; subcosta with branches hardly forked.  
**Merope**.
4. With but one genus ..... **Boreus**.
5. Tarsi end in two small claws ; tibial spurs not very long ; middle joint of labial palpi enlarged..... 6.  
 Tarsi end in one claw ; last joint bending back on the preceding ; tibial spurs extremely long ; middle joint of labial palpi slender ; median vein of fore-wings forked near base.  
**BITTACINI**—9.
6. Median vein of fore-wing forked near base, cubitus simple.  
**CHORISTINI**—7.  
 Median vein of fore-wing not forked near base, but the cubitus is so forked.....**PANORPINI**—8.
7. Several costal cross-veins and several cross-veins from subcosta to radius (new genus or subgenus).  
 One costal cross-vein (near base) and two from subcosta to radius.  
**Chorista**.
8. Beak much longer than distance between eyes ; no spine on cheeks.  
**Panorpa**.  
 Beak very short, not as long as distance between eyes ; a spine on each cheek..... **Panorpodes**.
9. No wings ; no elevated mesothoracic lobes ; and the posterior ocelli are more than twice their diameter apart.. **Apterobittacus**.  
 Wings present ; elevated mesothoracic lobes ; posterior ocelli not twice their diameter apart..... **Bittacus**.



*Notiothauma* McLachlan.—Based on a broked specimen. There is a perfect female in the Hamburg Museum. To McLachlan's description may be added that the legs are very slender, and with many long, stiff bristles; the subcosta and radius run out close together for a distance and then each forks. There are stiff, thick bristles on thorax and base of wings. The specimen is from Valdivia, Chili.

#### CHORISTA Klug.

*Euphania* Westwood is the very same form. *Panorpa ruficeps* Newm. goes in this genus, but differs from *C. australis* in larger size and more fumose wings. In several of the European museums is a species, labelled as *Euphania*, but with more cross-veins throughout, as in figure; it may form a new genus or subgenus.

#### PANORPA Linn.

Several genera have been separated off from *Panorpa*, but on characters of little value or variable in occurrence. *Aulops* Enderl, for those with the subcosta ending long before the stigma separates species which are evidently otherwise very closely allied, moreover the subcosta often bends near middle to the costa, and sometimes connected thereto. The number of cross-veins between anal and auxillary veins has been used, but often varies in the two wings of one specimen; the length of the abdomen is not of generic value, so that *Leptopanorpa*, *Himanturella* and *Campodotecnium* are synonyms of *Panorpa*.

#### BITTACUS.

I cannot find any valuable character to separate any species off from this genus except *B. apternus*. *Diplostigma* Navas is based on a character more or less evident in other species, probably due to age, *B. chlorostigma* has this double appearance of the stigma strongly developed. *Thyridates* Navas, for *B. chilensis*, also lacks a peculiar character; it and *B. blancheti* have three costal cross-veins, but *B. affinis* Westw. and *B. testaceus* Klug have one extra costal cross-vein. In *B. chilensis* the radial sector forks much before the forking of upper branch of the median; but in several species this is more or less evident, and in a series of *B. occi-*

*dentis* it is variable. *B. capensis*, *B. australis* and *B. sinensis* have an outer cross-vein between cubitus and anal; but in *B. pilicornis* and *B. strigosus* some have it, at least in one wing. The number of cross-veins between the first and second anal is also variable in at least one species, *B. occidentis*; in *B. stigmaterus* there is apparently always one such cross-vein. The number of cross-veins under the stigma is fairly constant for many species, but in *B. strigosus* it varies in one specimen. *B. apicalis* has but one cross-vein behind the stigma.

From the variation in venation as shown above I prefer to keep *Bittacus* in its broad sense, and *Harpobittacus* McLach., *Diplostigma* Navas, *Thyridates* Navas and *Haplodictyus* Navas as synonyms. I have seen the types of all. *Thyridates* has a rather different appearance, and may prove to have some structural character by which it may be retained as a separate genus.

The species of *Bittacus* in the Berlin Museum from Brazil may be separated as follows:

1. The first (inner) series of gradate veins makes a nearly direct oblique line across the wing..... 2.  
The upper cross-vein and lower one are farther out than the ends of the middle ones; the stigma is short, with two cross-veins behind it.....**brasiliensis.**
2. Stigma with one cross-vein behind; hind femora and tibia not dark at tip.....**flavescens.**  
Stigma six or seven times as long as broad, with one cross-vein behind; tips of hind femora and tibia dark...**geniculatus.**  
Stigma with two cross-veins behind; tips of hind femora and tibia black .....**femoralis.**

*Bittacus affinis* Westw. (in British Museum) has the stigma long and evenly curved behind, and one cross-vein behind it to the radius.

The three species of *Bittacus* from South Africa in the Berlin Museum can be separated as follows:

1. Faint clouds on the origin of the radial sector, its branches and elsewhere; tips of all femora and tibiæ dark; stigma four times as long as broad, with two cross-veins behind...**nebulosus.**  
No such clouds; stigma rather shorter; front femora and tibia not dark at tip..... 2.

2. Cross-veins in four series, or rather irregular (except first series),  
hind femora thickened.....**testaceus**.  
Cross-veins is three series; hind femora normal.....**capensis**.

There is also another African species in which the front femora are black on the apical half, probably a new species.

**Panorpa mexicana** n. sp.—Pale yellowish; antennae, except basal two joints, black; thorax unspotted; wings hyaline, a transverse brown spot over forking of radial sector, a narrow band below basal part of stigma, somewhat bent and interrupted beyond the middle, extreme apex very narrowly brown, and a narrow brown band before tip (in one wing interrupted); venation black, the five cross-veins in apical part of wing pale; stigma pale yellowish. Wings slender; the subcosta runs into the costa much before stigma in all the wings; stigma long and slender; radial sector connected back to radius twice, once at stigma; behind the basal connection is a cross-vein between the lower branch of the radial sector and upper branch of median, the forking of median hyaline. Fifth abdominal segment without tooth or process, sixth rather short, seventh more slender than usual. Expanse 25 mm.

*Type*.—♂. From Orizaba, Mexico (Crawford).

### TRICHOPTERA.

#### **Plectrotarsus gravenhorsti** Kol.

Several specimens from Hobart, Tasmania, differ in several respects from Kolenati's description, but also vary among themselves. All are females, and have the mouth-parts as figured. The radius is plainly curved at stigma, and several specimens have an extra fork in apical part of wing as in figure, in one specimen the discal cell in the hind wings is very much longer than in the others. The specimens in good condition show three hyaline spots on each fore-wing covered with snow-white hair, one at base of the third apical cell, one on the thyridium, and one on arcus; the "margine antico croceo" of Kolenati is scarcely evident, except in one specimen. From Kolenati one would infer that the legs, except tarsi, were pale; in these specimens the legs are black, except the front femora and hind tibiae, and in two specimens the front femora are blackish. The spines are very prominent, longer than the width of a joint.

I should think that the insect should be placed in the Limnephilidae, or rather, Phryganeidae.

**Chimarrha abyssinica** n. sp.—Yellowish, with golden hair; a large triangular black spot connecting the ocelli on vertex; antennae, except basal joints, brown; palpi brown beyond second joint, last joint longer than any others; vertex with a long narrow wart each side behind, thorax mostly blackish above and below; abdomen golden yellowish, legs also, but spurs blackish, and tarsi brown; wings a uniform black, but fore-wings with pale spots as follows: a large circular spot before anastomosis, not reaching either margin, with short white hairs; a streak in basal costal space, and one between cubitus and anal in basal part of wing, and a small white mark on arculus. In fore-wings the radius is sinuate before stigma, and the radial sector sinuate before forking; fork three is quite short pedicellate. Expanse 17 mm.

*Type*.—♀. From mountains near Harrar, Abyssinia (Kristensen).

**Marilia modesta** n. sp.—Brown; palpi with white hair; antennae with white hairs at tips of joints, head and thorax with grayish-white hair; legs pale, dark on tarsi, front tibia and tarsi black. Wings pale, with yellowish venation, and clothed with gray and black hair, but no distinct pattern, black toward tips, then paler, and extreme tip and fringe black, black at end of first apical cell, and on lower side of second cell near base, and below forking of cubitus is a dark spot; hind-wings gray, with black fringe, at base of hind-wings is a corneous spot, and from it a tuft of long black hair spreads out in all directions. Expanse 25 mm.

*Type*.—♂. From Villavicencio, E. Colombia, 450 meters (Fassl).

**Asotocerus falcatus** n. sp.—Head pale, palpi dark gray, vertex sparsely short haired; antennae pale, narrowly annulate with black; thorax brownish, with short golden hairs on middle; abdomen brown above, paler beneath; legs pale; hind tibiae curved, fuscous, and fringed with long, fine hairs. Wings grayish fumose, darker on costal region, especially near base; veins dark, surface clothed with very short, fine, golden hair, but not dense enough to give a golden color to wing; a black dot in base of third apical cell, apical fringe partly black; tips of wings very distinctly falcate; hind-wings fully as dark as fore pair, and less hairy, fringe mostly black. In hind-wings the first apical fork has an extremely short pedicel, second and third forks equal. Expanse 33 mm.

*Type*.—♂. From Trincomali, Ceylon, Sept. (Green).

**Amphipsyche vedana** n. sp.—♀. Whitish, with white hair; no spots on face; tips of antennal joints brown; vertex only slightly elevated each side; wings rather truncate at tip; marginal cell slender, the median cell also more slender than in *A. nirvana* but broader

than in *A. proluta*; fork 4 plainly pedicellated; middle legs with thin lamellae on tibiae and tarsus. Expanse 20 mm.

*Type*.—♀. Pusa, India, 15th September.

I cannot consider it the female of *A. nirvana* because of the smaller size, the pedicellate fork 4, narrower marginal and median cells and absence of spots on face, and especially as it was taken in September, while *A. nirvana* was captured in March. It agrees with *A. proluta* McLach. in slender marginal cell, but the median cell is broader and fork 4 pedicellate, and it is considerably smaller than the specimen of *A. proluta* I possess from Amurland.

***Amphipsyche nirvana*** n. sp.—♂. Whitish, with white hair; two approximate black spots on lower margin of face; tips of antennal joints brownish; wings yellowish hyaline, venation yellowish, fore-wings as figured, hind-wings much as in *A. proluta*; no cross-vein in marginal cell at end of subcosta; legs slender, middle and hind femora with long, erect, fine white hair. Lower appendages of male slender throughout (in *A. proluta* swollen before tips). Expanse 30 mm.

*Type*.—♂. Pusa, India, 23d March.

Differs from *A. proluta* in spots on face, genitalia, and the broader marginal and median cells.

Betten, in his report on Indian Trichoptera, figures this or a closely allied species under the name of *Phanostoma* sp., but *Phanostoma* has a different venation. Betten shows a cross-vein in the marginal cell not seen in *A. nirvana*.

***Phylloicus magnus*** n. sp.—Head pale; basal joint of antennae pale, then dark for several joints, then pale; antennae longer than wing expanse; thorax pale brownish; abdomen brown; legs pale, tarsi darker, spurs 2, 4, 4. Wings rather yellowish-brown on the base, darker brown beyond, fringe black. Wings in nearly all parts of venation as *P. assimilis*, but in fore-wings the median cell reaches much further basally than the discal cell, there is a dark spot in the thyridial cell below base of median cell. In shape the fore-wings are not as broad as in *P. assimilis*. The size is much larger than any other species. Expanse 45 mm.

*Type*.—♀. From Monte Socorro, Colombia, 3600 meters (Fassl).

***Oecetina mahadeva*** n. sp.—Head gray-haired, with some white hairs intermixed; palpi long, short haired, except the basal joint; antennae pale on basal joints below, darker above, beyond blackish with

white annulus at base of each joint for some distance out; thorax yellowish-brown, with some yellowish hair; abdomen blackish, greenish below; legs pale, but tibia and tarsi darker. Wings brownish, with mostly golden, or yellowish toward tip, but some black hair; three or four black spots at tip of wing on ends of veins; a black streak along median vein just before the anastomosis, and another, hardly as distinct on base of lower branch of the radial sector. Hind-wings infuscated, with long, dark, almost blackish fringe. The cross-vein between radial sector and median in fore-wings is almost its length before the end of the discal cell. Expanse 11 mm.

*Type*.—♀. From Chapra, Bengal, India (Mackenzie).

***Oecetina pretiosa*** n. sp.—Pale yellowish, with yellow hair, antennal joints tipped with brown; wings rather faintly brownish-yellow, with sparse golden hair and yellowish venation, but the cross-veins and forkings of longitudinal veins are black as shown in the figure; costa with long hairs; hind-wings narrow, acute, grayish, with very long gray fringe; legs pale yellowish. Expanse 14 mm.

*Type*.—♂. From Chapra, Bengal, India (Mackenzie).

***Setodes lineata*** n. sp.—Face white, with white hair; palpi very long; antennae yellowish, barely annulate with brown at tips of the joints; vertex pale brown, with three snow-white lines, one median, and an oblique one each side, thorax also brown, with two white lines; fore-wings also pale brown, with the small white lines, usually margined with black, a white crescent at tip, these lines placed as in figure; hind-wings rather dusky toward tips, fringe gray; legs slender whitish. Expanse 8 mm.

*Type*.—♂. From Chapra, Bengal, India (Mackenzie).

***Leptocella fenestrata*** n. sp.—Yellowish, clothed with white hair, antennae narrowly annulate with dark. Wings hyaline, with white, yellowish and black scales; before the anastomosis with black and white scales, the black in narrow irregular bands; from the stigma and beyond the anastomosis many yellowish scales forming, with the black scales, a network which encloses oval spots of white scales, fringe short; hind-wing with upper venation indistinct, although some of it can be traced, otherwise similar to that of *L. gemma* Müll. Upper male appendages bluntly truncate at tips. Expanse 25 mm.

*Type*.—♂. From Lino, Panama, 800 m. (Fassl).

***Macronema ulmeri*** n. sp.—This is probably the form figured by Ulmer, Coll. Selys, VI, Pl. III, fig. 16, as a variety of *M. hyalinum*. The wings are marked about the same, with the curved line in the apical part of wing, widened, however, below, the spot on the anal angle not as large as the stigmal spot above it, and the extension of the dark costal streak does not reach the posterior streak; in the hind-

wings the upper apex is blackish, and there is a small faint cloud before the fork of the radial sector. Body black, venter pale yellowish; face pale, but a large black spot on middle of front margin; antennae black, except yellow basal joints; femora yellow, tibia II and III brown, tarsi II and III black; tibia I jet black, tarsi I pale; spurs pale. Expanse 23 mm.

*Type*.—♂. From Rio Negro, Colombia, 500 m. (Fassl).

**Centromacronema nigrifrons** n. sp.—Body black, as dark beneath as above, head coal black and basal joint and two or three others of antennae also coal black, beyond paler, and the annulations so faint as almost invisible. Wings much as in *C. apicale*, the yellow is a deeper and more reddish-yellow, and the apical black, which is sharply limited, does not reach before the anastomosis; in the hind-wings the fifth fork barely reaches before the cross-vein. In shape the fore-wings are plainly shorter and more truncate at tips than *C. apicale*. Expanse the same.

*Type*.—♂. From Rio Negro, E. Colombia, 800 meters (Fassl).

**Centromacronema extensum** n. sp.—Brown above, yellowish beneath; antennae yellowish; fore-wings nearly uniform brown, like some forms of *C. auripenne*, much of the hind-wings also similar, but paler behind than in front. In venation similar to *C. auripenne*, except the lower part of fork 5 is united for a short distance with the next vein (not connected thereto by a cross-vein); in the hind-wings the fifth fork extends much before the cross-vein. In shape the fore-wings are longer and more slender than *C. auripenne*; and the last joint of the maxillary palpi, although very long, is not as long as in *C. auripenne* and *C. apicale*. Expanse 44 mm.

*Type*.—♂. From Lino, Panama, 800 m. (Fassl).

#### **CORDILLOPSYCHE** n. gen.

Related to *Polycentropus*, with spurs 3, 4, 4; forks 1, 2, 3, 4, 5 in fore-wings; forks 2, 3, 5 in hind-wings; in hind-wings discal cell is open; hind tibia nearly twice as long as hind femora; antennae not very slender; stigma very long.

**Cordillopsyche costalis** n. sp.—Pale yellowish, antennae almost white; fore-wings with costal area nearly wholly brown, stigma dark, rest of wing mostly pale brown, with many hyaline spots, one beyond the anastomosis is in the form of a transverse band, a large dark spot at the anal angle, and cubitus mostly dark bordered, a black dot in thyridial cell below base of the discal cell; hind-wings gray-hyaline, with a long dark gray fringe. Expanse 15 mm.

*Type*.—♀. From Cañon del Norte, Tolima, Colombia, 1700 m., March (Fassl).

**Rhyacophylax varius** n. sp.—Brownish; vertex black, antennae whitish, palpi dark beyond basal joints; thorax black, legs yellowish, femora and tips of tibia blackish, wings brown, black on tips, and a large black spot in middle, before it is an area with pale greenish scale-like hairs, and beyond it are two incomplete bands, the costal parts of the bands broader and white, the rest greenish, the outer band broader than the inner band; apical fringe mostly white. Expanse 14 mm.

*Type*.—♂. From Turricares, Costa Rica.

**Symphitopsyche plutonis** n. sp.—Deep dull black; antennae and legs brownish-yellow. Head with short golden hairs, more dense on the pronotum, the short hair of the wings, in some lights, shows yellowish. Eyes rather small, head strongly convex above eyes, each side on vertex is a large subtriangular wart; antennae faintly ringed, the joints moderately long; second joint of palpus longer than third or fourth, which are subequal, and convex below, fifth longer than third and fourth together. Pronotum rather large, with a large wart each side near middle, and a smaller one each lateral side. Venation nearly as in *S. mauretanic* McLach. as figured by Ulmer; in hind-wings the subcosta and radius very plainly unite before tip, in the fore-wings the subcosta runs into the margin, but before its tip it is very close to the radius, and in some lights appears to run into radius. The discal cell is a trifle shorter than in *S. mauretanic*, in fore-wings the connecting veinlet from cubitus to anal is much farther out and more oblique, and in hind-wings the second fork does not reach back to the cross-vein beneath discal cell, and the cross-vein is transverse, not oblique; in hind-wing the radial sector may be connected to median, but the vein here is very indistinct. Expanse 13 to 15 mm.

*Type*.—♂. From mountains near Harrar, Abyssinia (Kristensen).

**Dipseudopsis buddha** n. sp.—Reddish or yellowish-brown, vertex, mesonotum, and dorsum of abdomen, blackish, tips of antennal joints dark; wings brown or dark yellowish-brown, with sparse golden hair, stigma pale, and pale spots in bases of second and fourth apical cells and just before base of median cell, and also just below fork four; hind-wings a uniform brown; legs yellowish-brown. In fore-wings forks 1 and 3 are each a little shorter than their pedicels, forks 2 and 4 each reaching to anastomosis. The modified spur of hind tibia of male as figured; the short process strongly curved, but without teeth on edge, the long process furcate toward tip. Expanse 25 mm.

*Type*.—♂. From Chapra, Bengal, India (Mackenzie), and Pusa, India, 23d August. In shape of the spur related to *D. indicus* McLach., but the processes are shorter, and the short one without teeth.



**Nyctiophylax abrupta** n. sp.—Face with yellowish-brown hair, a large dark brown tuft each side on vertex, with whitish hair between; antennae pale yellowish, the tips of the joints narrowly pale brown; pronotum with yellowish hair; wings with mostly yellowish, and some brownish hair, forming a very much mottled appearance, but not strongly contrasting, a more prominent brown mark at base of the stigma, and at tips of the longitudinal veins; hind-wings grayish, the fringe pale; legs pale yellowish, the hind tarsi marked with brown; abdomen brown, tips pale. Expanse 9 mm.

*Type*.—♀. From Chapra, Bengal, India (Mackenzie).

**DOLOCHOREMA** n. gen.

Related to *Psilochorema* and *Atopsyche*. An extra cell beyond end of the discal cell in fore-wings; palpi as in *Atopsyche*; venter of abdomen without the preapical spines, but the fourth segment (of male at least) with a slender appendage as in some genera of Hydropsychidae; hind-legs with many minute erect spines; spurs 2, 4, 4.

This genus is closely related to *Atopsyche* and *Psilochorema*, and less closely to *Hydrobiosis*; all have many stiff erect hairs on the wings like Hydroptilidae; in all the palpi have the last joint very long, slender and flexible, but perhaps not divided, the tip of the second joint of the palpi is hyaline white; the hind-legs in all have minute spines; all, except *Hydrobiosis*, have what looks like an abnormal venation.

**Dolochorema irregularis** n. sp.—Similar in size and general appearance to *Atopsyche longipenne*, but the markings all paler; the joints of antennae beyond middle are much more broadly banded with dark than in *A. longipenne*; anterior tibia with pale bands in middle and at tip; first and second tarsal joints dark except tips; other legs pale; wings a nearly uniform brown, with many black hairs, basal anal area darker than rest of wing, fringe brown and black; hind-wings gray fumose, darker at tips, fringe on hind margin extremely long; abdomen black above, pale yellowish beneath. Expanse 26 mm.

*Type*.—♂. From Cuzco, S. E. Peru, 2300 m. (Fassl).

## EXPLANATION OF PLATES.

## PLATE XXIII.

- FIG. 1.—*Setodes lineata*, fore-wing.  
 “ 2.—*Symphitopsyche plutonis*, male genitalia.  
 “ 3.—*Oecetina pretiosa*, fore-wing.  
 “ 4.—*Symphitopsyche plutonis*, fore-wing.  
 “ 5.—*Symphitopsyche plutonis*, last segment of female.  
 “ 6.—*Oecetina pretiosa*, maxillary palpus.  
 “ 7.—*Malacomyza terminalis*, head and antenna.  
 “ 8.—*Dipseudopsis buddha*, genitalia.  
 “ 9.—*Hemerobius greeni*, male genitalia.  
 “ 10.—*Notiobiella viridineris*, male genitalia.  
 “ 11.—*Plectrotarsus gravenhorsti*, fore-wing.  
 “ 12.—*Curgia albomaculata*, fore-wing.  
 “ 13.—*Amphipsyche nirvana*, male genitalia.

## PLATE XXIV.

- FIG. 14.—*Plectrotarsus gravenhorsti*, mouth parts.  
 “ 15.—*Calomantispa spectabilis*, wings.  
 “ 16.—*Asotocerus falcatus*, male genitalia.  
 “ 17.—*Amphipsyche nirvana*, fore-wing.  
 “ 18.—*Malacomyza terminalis*, fore-wing.  
 “ 19.—*Dipseudopsis buddha*, hind spur, male.  
 “ 20.—*Amphipsyche vedana*, middle tarsus, female.  
 “ 21.—*Amphipsyche vedana*, fore-wing.  
 “ 22.—*Nothochrysa aequalis*, male genitalia.

## PLATE XXV.

- FIG. 23.—*Anisoptera notha*, fore-wing and hind leg.  
 “ 24.—*Chorista* sp., genitalia (Paris Museum).  
 “ 25.—*Ditaxis biseriata*, wing.  
 “ 26.—*Mantispa chilensis*, wing.  
 “ 27.—*Theristria delicatula*, wing.  
 “ 28.—*Chorista* sp., fore-wing (Paris Museum).  
 “ 29.—*Leptoperla beroe*, wing and hind tarsus.  
 “ 30.—*Leptoperla opposita*, wing and hind tarsus.  
 “ 31.—*Centromacronema extensum*, genitalia.  
 “ 32.—*Centromacronema nigrifrons*, genitalia.

## PLATE XXVI.

FIG. 33.—*Leptocella fenestrata*, genitalia.

“ 34.—*Sisyra bakeri*, genitalia.

“ 35.—*Cordillopsyche costalis*, wings.

“ 36.—*Brachynemurus fenestratus*, tip of abdomen.

“ 37.—*Glenoleon radialis*, tip of hind-wings.

“ 38.—*Dolochorema irregularis*, hind-wing.

“ 39.—*Ochthopetina clarissa*, ventral plate.

“ 40.—*Dolochorema irregularis*, fore-wing.

“ 41.—*Anisoptera fasciatella*, fore-wing.

“ 42.—*Leptocella fenestrata*, marks of fore-wings.







